

Mansoura University	MATH001	3 / 4 / 2019	
Faculty of Engineering	Midterm	Time allowed: 60 minutes	
BME Program	MATH 1	Full Mark: 20 marks	
Spring 2018-2019	الاسم :		

THIS EXAM CONTAINS 4 QUESTIONS IN 2 PAGES

- 1) Use the mathematical induction principle to prove that for any positive integer n

$$1^3 + 2^3 + 3^3 + \dots + n^3 = \frac{n^2(n+1)^2}{4}$$

- 2) Given the two matrices

$$A = \begin{bmatrix} 2 & 6 \\ 1 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 3 & -4 \\ -3 & 5 \end{bmatrix}$$

Evaluate the following

a) $3A - 2B$

b) A^2

c) $A^T B$

3) Use Gauss-Jordan elimination method to find the solution of the system

$$x_1 + x_2 + x_3 = 3$$

$$2x_1 + 3x_2 + 7x_3 = 0$$

$$x_1 + 3x_2 - 2x_3 = 17$$

4) Find the inverse of the matrix

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$$
